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THE ALASKA HIGHWAY

NOVEMBER 29 (legislative day, NOVEMBER 18), 1943.—Ordered to be printed

Mr. SCRUGHAM, from the Committee on Post Offices and Post Roads, submitted the following

REPORT

[Pursuant to S. Res. 161]

Study of the Alaska Highway has been undertaken under authority of Senate Resolution 161, adopted July 1, 1943, reading in part as follows:

Resolved, That the Committee on Post Offices and Post Roads, or any duly authorized subcommittee thereof, is authorized and directed to make a full and complete study and investigation with respect to the construction and maintenance of the American-Canada Highway, and proposed feeder roads, as a part of the war effort or otherwise, including the allocation of materials, equipment, costs, and manpower for the construction or maintenance thereof, and practices incidental thereto. The committee shall report to the Senate at the earliest practical date the results of each study and investigation, together with its recommendations for necessary legislation.

Pursuant to this resolution a subcommittee of the Committee on Post Offices and Post Roads was appointed to make the study and investigation. The subcommittee consisted of Senators James G. Scrugham (chairman), Dennis Chavez, James O. Eastland, John L. McClellan, C. Douglass Buck, William Langer, and E. H. Moore.

The subcommittee was also instructed to make a report on Senate bill 579, to authorize the construction of a military supply highway to Alaska by way of Prince George, British Columbia, and Whitehorse, Yukon Territory.

Two members of the subcommittee, Senators Scrugham and Buck, assembled at Great Falls, Mont., on August 27, and were flown by Army transport plane to the engineering headquarters of the Alaska Highway at Edmonton, Alberta, Canada, where they were joined by Senator Langer.

On subsequent inspections and studies, the subcommittee was accompanied and assisted by Maj. Gen. Philip B. Fleming, Administrator of the Federal Works Agency; Brig. Gen. J. A. O'Connor and L. D. Worsham; Thomas H. MacDonald, Commissioner of Public

Roads; J. S. Bright, district engineer of the Public Roads Administration; Col. K. G. Bush; Col. Paul Betters; Col. L. Friedlich; and Maj. Bryce Harlow, of the United States Army. In the next 9 days the subcommittee traveled over 4,000 miles, inspecting the highway, Alaskan ports, and feeder roads with stops in Fort St. John, British Columbia; Peace River Bridge, British Columbia; Fort Nelson, British Columbia; Watson Lake, Yukon Territory; Whitehorse, Yukon Territory; Skagway, Alaska; Juneau, Alaska; and Fairbanks, Alaska. Location of the entire highway was studied by flying over it at a low altitude and sections were observed in detail in 304 miles of travel by bus. At each of the stops, air-service installations and associated transport services were inspected. Problems of supply and service to support a major air route to Alaska and of highway construction and transport were discussed and data collected from the men charged with the solution of these problems.

The location of the highway, its connections, and its relation to other transport routes are shown in figure 1.[1] The information regarding the agreement with Canada and the work of the Bureau of Public Roads was furnished by Thomas H. MacDonald, Commissioner of Public Roads. Information regarding the work of the Army engineers was supplied by Capt. Richard Neuberger, aide to Gen. J. A. O'Connor, A. U. S., and Col. L. Friedlich, A. U. S.

NEED FOR THE HIGHWAY

Construction of a highway through the great wilderness that separates the United States and the settled portions of Canada from Alaska has been advocated for many years. In past years, two congressional commissions studied the proposal and made favorable reports, one in 1933 and the other in 1940. Further steps, such as field studies, to determine the best route, and construction costs had not been authorized at the time the United States entered the World War.

In the months that followed Pearl Harbor, our ability to defend Alaska, particularly the shipping lanes of the Gulf of Alaska, against Japanese attack was uncertain. Failure to adequately defend it would result in the establishment of enemy air and naval bases for operation against the western part of the United States and against Pacific shipping. Defenses of Alaska and the Aleutians were supplied almost entirely by the Pacific water route, then being attacked by enemy submarines.

In view of the urgency of the situation, a special committee of the Cabinet, consisting of the Secretary of War, Secretary of the Navy, and Secretary of the Interior, was called upon to decide if a highway to Alaska should be built, and to select a route.

On February 2, 1942, this Cabinet committee, together with representatives of the War Department General Staff concluded that construction of a highway connecting the United States and Alaska was advisable and, further, that this highway should be sited along the line of the then existing chain of airports from Edmonton, Alberta, to Fairbanks, Alaska, furnishing a supply route to Alaska and, at the same time, servicing and supplying the airfields along the route and

[1] Not printed.

providing a means of safety for personnel engaged in ferrying aircraft from the United States to Alaska.

The project, approved by the Chief of Staff, Army of the United States, on February 6, 1942, and by the President on February 11, 1942, authorized the construction of a pioneer road from Fort St. John to Big Delta (connecting at these points with existing road nets in Canada and Alaska). This pioneer road would be constructed by United States Engineer troops, and be followed by contractors furnished by the Public Roads Administration, who would improve the pioneer road to the authorized standard of a highway. On February 14, 1942, the Chief of Engineers was directed to proceed with the project as outlined above.

The existing air route from Edmonton, Alberta, was via Fort St. John, British Columbia; Fort Nelson, British Columbia; Watson Lake, Yukon Territory; Whitehorse, Yukon Territory; and thence into the interior of Alaska. The subcommittee has been reliably informed that this is the most direct air route to Alaska from the greater part of the United States. The early stepping stones along this route were small airfields, lacking in personnel, shops, hangars, and radio facilities. There were no emergency landing fields between the widely spaced airfields, adding greatly to the hazard of plane movements. A critical deficiency was dependence upon air transport for aviation gasoline, food, and other supplies for all personnel at the intermediate points. Military strategy dictated that the air route to Alaska be conditioned for the movement of whatever number of planes might be required in operations in the Northwest Pacific area, and for providing Alaska with essential supplies should the water route become too hazardous. This has required grading and surfacing a connecting highway and building airport service facilities.

The need was immediate and urgent, and while the general situation has now materially improved, the necessity remains for both a highway and an air route suitable for large operations as a part of the permanent Alaska defenses. It was evident that a highway to Alaska would have a variety of peacetime uses and would contribute to development of both Canada and Alaska, but the decision to build the highway was based solely on military considerations.

AGREEMENT WITH CANADA

On February 16, 1942, a declaration of military necessity concerning the highway was made by the Secretary of War to the Secretary of State with the view of securing rights-of-way through Canadian territory. Informal discussions were begun with Canadian officials, who agreed to the immediate beginning of reconnaissance surveys by United States Army engineers and suggested that the question of construction be referred to the Permanent Joint Board on Defense—United States and Canada. This Board recommended construction of the highway on February 26, 1942. On March 6 the Canadian Government announced approval of the recommendation of the Board and its acceptance of the offer of the United States to construct the highway. Formal agreement between the two Governments was consummated by an exchange of notes, that from the American Minister to Canada on March 17, 1942, and that from the Canadian Government on March 18, 1942. These notes accepted an agreement under

which each Government obligated itself to the performance of certain duties in the construction of the highway that would insure its completion in the most expeditious manner.

The Government of the United States agreed to make the necessary surveys and to construct a pioneer road by the use of Army Engineer troops for surveys and initial construction; to arrange for the completion of the highway under contracts made by the Public Roads Administration with Canadian and American contractors; to maintain the highway until the termination of the present war and for 6 months thereafter unless the Canadian Government should prefer to assume maintenance of the sections in Canada at an earlier date, and agreed also that, at the conclusion of the war, that part of the highway which lies in Canada shall become an integral part of the Canadian highway system subject to the understanding that there shall be no discriminatory conditions in relation to the use of the road as between Canadian and United States civilian traffic.

The Canadian Government agreed to acquire necessary rights-of-way in Canada, to waive import duties and other transit charges on shipments from the United States to the project and over the project to Alaska, or vice versa; to remit income taxes on income of United States residents employed on the project; to facilitate admission of United States residents employed on the project into Canada with the understanding that repatriation of such employees would be undertaken by the contractors or by the United States Government, and to permit the procurement of timber, rock, and gravel from Crown lands for use on the highway.

ROAD CONSTRUCTION METHODS AND PROGRESS

Assistance of the Public Roads Administration in the construction of the highway was requested by the Chief of Engineers of the War Department, on March 6, 1942, in a letter addressed to Brig. Gen. Philip B. Fleming, Administrator, Federal Works Agency. The technical staff of the Public Roads Administration was placed at the disposal of the War Department and the terms of cooperative work on the highway were agreed to in an exchange of letters between Thomas H. MacDonald, Commissioner of Public Roads, and Brig. Gen. C. L. Sturdevant, Assistant Chief of Engineers.

Engineers of the Army and the Public Roads Administration jointly were to reconnoiter and determine the most feasible route between the established control points, the Army retaining final decision as to the route. Thereafter, the United States Army engineers were to locate a trail road, with such assistance as might be necessary from the Public Roads Administration, and construct the trail road with engineer troops. The Public Roads Administration was to locate and plan a permanent highway, following the location of the Army road as closely as might be practicable and construct the highway with all possible speed using the experienced road-building forces of contractors from the United States and of Canada. Figure 2 [1] shows the detailed location of the route constructed.

Preparations for the greatest single highway construction job ever undertaken did not await the conclusion of governmental negotiations.

[1] Not printed.

In March, Army and Public Roads Administration engineers were moving into the frozen, northern wilderness, on snow shoes and by dog team. Soon they were exploring moutain passes and the course of rivers by airplane and on foot.

Engineer troops were also moving in. From the railhead at Dawson Creek to Fort St. John, a distance of 48 miles, there was a provincial road passable in winter and in dry weather. From Fort St. John a winter road extended 265 miles to Fort Nelson. This road was passable only when the ground was frozen. The Thirty-fifth Engineer Regiment, commanded by Col. Robert D. Ingalls, Corps of Engineers, was selected for the difficult mission of beginning work at Fort St. John. The regiment, equipped with special arctic clothing, began arriving at Dawson Creek on March 10 and, after many difficulties and hardships in weather 35° below zero, reached Fort Nelson on April 5 with all equipment and some 900 tons of supplies. For men inexperienced in such winter operations, this 325-mile march was a remarkable performance. The regiment began work but made slow progress during April, May, and early June because of heavy rain, floods, and wet ground. After July 1, however, this regiment averaged 3 miles a day, and on September 24 had reached a point 305 miles from Fort Nelson where it met the Three Hundred and Fortieth Engineers working eastward from Teslin Lake.

With the spring thaw the Thirty-fifth Engineers were cut off from ground communication and every effort was made to push a road through to Fort Nelson. The Three Hundred and Forty-first Engineers under Col. Albert L. Lane arrived about May 1 and led the way to Fort Nelson, which was reached on August 26. The Eighty-fifth Engineer Regiment, under Col. David L. Neuman, and later under Col. Heath Twichell, arrived about June 1 and backed up Colonel Lane's regiment with culvert construction, grading, and drainage work, thus permitting the leading regiment to advance rapidly.

The Eighteenth Engineer Regiment, under Col. E. G. Paules, arrived at Whitehorse on April 29 and began work northwest of Whitehorse. This regiment advanced 220 miles by August 1 and then encountered difficult going through permanently frozen ground. On October 25 it met the Ninety-seventh Engineers working south from Alaska at a point 313 miles northwest of Whitehorse.

The Ninety-third Engineers, under Col. Frank M. S. Johnson, and the Three Hundred and Fortieth Engineers, under Col. F. R. Lyons, arrived at Skagway in April and remained there until June awaiting equipment. The Ninety-third Engineers then moved to Carcross and constructed 99 miles of difficult road to Nisutlin Bay on Lake Teslin. After July it improved sections of pioneer road built in the first advance.

The Three Hundred and Fortieth Engineers moved by trail and water route to Morley Bay on Lake Teslin and began work in both directions. They soon completed 9 miles of road north to Nisutlin Bay. The principal effort was to the south and on September 24 they met the Thirty-fifth Engineers at a point 240 miles from Nisutlin Bay.

The Ninety-seventh Engineers, under Col. S. C. Whipple and later under Lt. Col. L. E. Robinson, landed at Valdez, Alaska, late in May but could not get over Thompson Pass on the Richardson Highway until the middle of June. After repairing the Richardson Highway it

moved to Slana where it began construction of a road through Mentasta Pass in the Alaska Range at the end of June. It completed a connection with the main route of the Alaska Highway and then worked south, meeting the Eighteenth Engineers on October 25 at a point 194 miles from Slana.

These 7 regiments had a total strength of about 10,000 men, Supervision and administration was from 2 sector headquarters. 1 at Fort St. John controlling the work southeast of Watson Lake and the other at Whitehorse controlling the remainder of the work. Brig. Gen. William H. Hoge organized both offices and supervised all activities until June 6 when Col. James A. O'Connor assumed charge of the southern sector. Both sector commanders reported directly to the Chief of Engineers until the virtual completion of a road practicable for truck traffic. Enlarged plans for such traffic and extension of other projects in the region led to the organization of the Northwest Service Command under General O'Connor who assumed charge in September.

In the meantime the Public Roads Administration had been organizing a large force of contractors to construct the final highway. The Alaska Highway district was organized and placed in charge of J. S. Bright, district engineer. Services of 4 management contractors were obtained and through them 47 contractors were employed on a cost-plus-fixed-fee basis. Their men and equipment began to arrive at the points of entry to the highway close on the heels of the first engineer units and these forces increased rapidly to a total of about 7,500 men. During May, many survey parties were in the field supplied by canoe, float plane, and more than 60 packhorse outfits.

Progress was slow until near the end of June, but with the arrival of more workmen and equipment, establishment of shops and supply bases, and drying of the ground the bulldozers began to forge ahead toward their objectives.

In the effort to open up a through route as soon as possible, contractors' forces were called upon by the Corps of Engineers to assist in the construction of certain sections of the pioneer road. With a maximum of effort a continuous road was opened in November 1942, about 8 months after initiation of the work.

The road built was a pioneer trail located on the most direct route over which a bulldozer might force its way. With the Arctic winter closing in, there was no time to move large quantities of earth for cuts and fills, or to drill and blast a road in the face of cliffs. The road went where a bulldozer could go, with steep grades and sharp curves. Streams, large and small, crossed by the route were bridged by trestles built largely with native timber. This one phase of the work was in itself a big job. The bridges were regarded as temporary. Those on most streams were not expected to withstand the spring and summer floods with massive ice flows.

Excellent progress was made on the pioneer road during the fall months. Winter sets in early in the Yukon Territory and Alaska. Freezing at night begins in September and becomes severe by late October. But this did not prevent the Army and civilian forces from reaching the goal that had been set. Working two shifts of 10 or 11 hours each, in snowy and freezing weather, much of the time in darkness with flashlights carried ahead as objectives for the bulldozers,

loading and hauling gravel that froze in the trucks before it reached the road, and living in camps under pioneer conditions, they stuck with the job. On November 20 closing of the last gap in the pioneer road was celebrated in a snowstorm at Soldiers Summit on the southern shore of Kluane Lake.

During the winter of 1942–43 operations consisted chiefly of work in building warehouses, shops, barracks; operation of sawmills producing bridge timbers; rock excavation at a limited number of places where heavy rock work was necessary; and construction of major bridges. Intensive efforts were made under the most trying conditions to erect permanent bridges across the Kiskatinaw, Peace, Sikanni Chief, and Muskwa Rivers on the southern portion of the projects. Temporary bridges were not expected to survive—and did not survive the spring floods. Contractors' forces worked in darkness and subzero weather, completing bridges across these large streams in preparation for the heavy hauling planned to begin with the first mild weather.

The Northwest Division of the Northwest Service Command, Corps of Engineers, was established in December to execute all construction, maintenance, and repair for the Army in northwest Canada. Division headquarters were established at Edmonton under the direction of Col. Theodore Wyman, Jr., and after April 2, under Brig. Gen. L. D. Worsham. Improvement of the pioneer road to an all-weather standard during the season of 1943 was planned. The specifications for the improved road called for a 26-foot roadbed with 20 to 22 feet of surfacing with local gravel or crushed stone. Grades, in general, were kept below 10 percent maximum. Curvature and sight distance were subject to economical determination and are of a standard generally permitting speeds of 40 miles per hour.

Six of the Army engineer regiments were withdrawn from the highway in February. One regiment remained south of Whitehorse and did excellent work throughout the summer.

The highway that will serve the air route to Alaska, Alaskan bases, and post-war traffic to the northwest portion of the continent, has been built largely during the 1943 construction season. This could never have been done without the pioneer road built in 1942. The road has been used to bring in 81 contractors, 14,000 civilian workers, 6,000 heavy units of road-building equipment, and all accessories and supplies needed for repair, maintenance, and operation of equipment and feeding, housing, and medical attention for the men. The average contractor was 2,700 miles from his home area and had to bring with him, or have supplied to him, every single item that might be needed for work or care of his men.

During each of the road-building months of 1943, work has progressed at a rapid rate. Modern road-building equipment has a high production rate when operated without interruption. At most camps the machinery was kept going 20 to 22 hours per day by two shifts of 10 to 11 hours each. The 1943 program required 5,300 acres of clearing and grubbing, 19,600,000 cubic yards of excavation, placing of 5,900,000 cubic yards of selected material for roadway base, and 1,120,000 cubic yards of surfacing material. At the time of the visit by the subcommittee in September, this work was expected to be 80 percent complete by the end of September and to be completed by the end of October.

One major set-back slowed the work in 1943. It was expected that many of the timber trestles would be washed out during the spring thaw, and when this happened new timber was already cut and replacement was rapid. However, in early July continued rains, said by some to be the heaviest in 50 years, took out practically all of the trestle bridges for more than 200 miles on either side of Fort Nelson. These were rapidly replaced and the work went on.

The bridge program was a big item in the 1943 program. Permanent bridges had to be constructed across many large rivers such as the Kiskatinaw, Peace, Sikanni Chief, Muskwa, Liard, Coal, Hyland Rivers, and glacial streams such as the Duke, Donjek, Tanana, Robertson, and Johnson Rivers. In all there were 86 bridges to build. Delays in obtaining and delivering bridge steel have slowed up this work and a few of the superstructures will be placed early next year. In the meantime at such streams traffic is moving over wood trestle structures.

Work on the Alaska highway produced severe strains on all of the equipment. Working in muskeg, frozen ground, and in beds of great boulders caused many break-downs. It was amazing that so many machines could be kept in operation under such severe conditions. Work at night and for 20 to 22 hours out of 24 greatly increased the rate of machine failure. The rate was particularly high in the winter months at 40° to 50° below zero when drive shafts and other metal snapped under light loads, and frozen grease caused gear failures. Shops with stocks of repair parts and facilities for welding and all sorts of repair work were kept in operation day and night. But these shops could not obtain or manufacture many repair parts. Many machines were kept idle awaiting parts from the States that did not arrive for weeks or never arrived because of the total of the demands made on manufacturers.

An important element in the success of this project has been the medical and hospital service organized by the Public Health Service. The prompt and efficient care and hospitalization given all sick and injured workmen and inspection of water supplies and camp sanitation resulted in above-average health conditions on the job and high morale among the workers.

CURRENT STATUS OF PROJECT

When the subcommittee inspected the project in early September, construction of the roadway and surface was in its final stage with full completion by the end of October practically assured. The bridge program was not so well advanced, but it appeard that the bridges south of Whitehorse would be completed by the end of the year and those beyond before the spring break-up and consequent destruction of the temporary crossings.

The hundreds of miles of completed highway, some of which carried an extremely heavy truck traffic during the summer months, was sufficient to demonstrate what the finished highway will be like. The highway is generally adequate for the purposes for which it has been built. There are many long, straight stretches on level road—one in Alaska along the Tanana Valley is 22 miles long. On the other hand, in the total length of the highway, there are a considerable number of grades of 10 percent and curves of extreme sharpness.

In September busses were traveling 900 miles from Dawson Creek to Whitehorse in 48 hours, with stops for meals and passengers and frequent slowing of speed along sections under construction and at detours around culverts and bridges being built.

The surface is largely of gravel obtained from many sources along the road, Some of it is of ideal grading for a smooth road surface. At a number of places it has been necessary to crush gravel or stone for surfacing. There is every indication that the durability of the surface is adequate for the severe war uses to which it is being put. During the summer a stream of heavily loaded trucks has rolled over the completed sections with no sign whatever of structural weakness. The surface is very dusty in dry weather and constant maintenance with blade graders is necessary but traffic is not slowed down because of deficiencies in the finished surface. The dust is a very serious handicap to traffic operation and a safety hazard in dry weather.

The bulldozers pushed the muskeg soil aside and suitable soil was brought in to replace the muskeg. On the northern end of the project miles of road are built on permanently frozen ground, but engineers believe that they have so constructed the road that continuous maintenance will prevent serious trouble on such locations

The worst condition is where the road runs along sloping ground with seepage of water from above. Some of this ground is frozen only a foot or so below the surface. Such ground is covered by a thick mat of decaying vegetative matter and moss that forms an insulating blanket. Water from the summer thaw and springs flows beneath this blanket in the winter months when temperatures are far below zero. It emerges on the road and freezes, and in the course of a few weeks piles up to several feet in thickness. Such icing occurred at more than 80 places on the southern half of the highway in the winter of 1942–43 and to an even greater extent on the northern half. Public-roads engineers believe that much of the icing can be eliminated by breaking the ground cover above the road, allowing the water to emerge and freeze above the highway.

In sub-Arctic regions, streams freeze over on the surface but continue to flow beneath the ice. Glacial outflows in the channel and surrounding ground upstream produce a pressure that causes a breakthrough to the surface and formation of ice occurs there from time to time. Sometimes the ice builds up to 20 or 30 feet in thickness. Low bridges have been completely encased in ice. There was much trouble from this cause in the past winter. Permanent bridges are being erected across all of the larger streams that will effectively prevent such troubles.

In the Rocky Mountain region near Muncho Lake the highway crosses great alluvial fans of gravel that begin far up on the mountains and extend to streams through the valley. The spring thaw causes a large flow of water through these great gravel beds a mile or more wide, and quantities of gravel move forward with each large flow of water. There was no possibility of locating the highway around these beds. It is expected that gravel will be washed down upon the highway and will have to be removed by maintenance forces.

The division engineer is organizing equipment and men for constant maintenance of the highway. Along much of the highway, gravel is readily available in unlimited quantity. At places where crushing of the gravel is necessary, the contractors' forces are leaving great piles of crushed material for use in maintenance.

This highway, stretching for a great distance through a subarctic region, has presented many problems and difficulties never before met by our engineers. That the problems have been solved, and that a permanent land route to Alaska is completed for use, is evidenced by the great tonnage that has been carried over the 900-mile section between Dawson Creek and Whitehorse during the past summer. To preserve this route for the future, it must be maintained. But this is a more simple problem. The difficult problems have been solved.

USE MADE OF THE HIGHWAY

The use made of the highway is not largely a through movement from the southern terminus to Fairbanks and is not likely to be except in an emergency. The primary use is to establish and serve the air route to Alaska with its several intermediate points. A secondary use that would be of great importance, should the sea route to Alaska become unsafe for shipping, is the supplying of the whole Alaska area by land transport.

The following tabulation shows distances along the highway from Dawson Creek, British Columbia, the southern terminus:

	Miles		*Miles*
Dawson Creek	0	Nisutlin Bay	791
Fort St. John	48	Whitehorse	902
Fort Nelson	304	Junction with Haines Road	994
Lower Liard River crossing	517	International Boundary	1, 186
Hyland River	612	Tok Junction—road to Gulkana	1, 283
Access road to Watson Lake	639	Big Delta	1, 393
Upper Liard River crossing	645	Fairbanks	1, 483

These are distances along the road as it was traveled in the summer of 1943. A number of cut-offs then nearing completion will materially shorten the total distance.

The subcommittee in traveling along and over the highway was presented with convincing evidence that the highway is already accomplishing the purpose for which it was built. Day and night trucks flow over the highway carrying supplies for the air route. Gasoline for planes and food for aviation personnel is a first essential. All of the airports are being expanded. Runways are being increased in size and length, hangars with shop facilities and barracks built, and radio communication and beam apparatus installed. Flight strips for emergency landings are being built at many intermediate points along the highway. All this has required a tremendous movement of materials, equipment, men, and supplies.

A pipe line for gasoline has been built from the port at Skagway to Whitehorse. From there one branch north to Fairbanks is being completed and another southeast to Watson Lake is already in use. The highway has been essential in delivering material and workmen on this pipe line. Much of the pipe has been delivered from the rail head at Dawson Creek.

Oil fields at Fort Norman on the Mackenzie River are being developed and a pipe line constructed to Whitehorse. Crude oil is to be delivered at a refinery now under construction at Whitehorse and delivered through the pipe line along the highway, and the direction of flow through the pipe line to Skagway may be reversed to deliver fuel for naval and other purposes. A large quantity of pipe has been delivered over the highway for the line to the Fort Norman field.

The heavy-duty trucks used in hauling this pipe have imposed loads upon the highway as heavy as are likely to be imposed at any time in the future.

To supplement its radio communication network, the Army has nearly completed a telephone line from Edmonton to Fairbanks. The construction is similar to that which parallels all railroad lines. The highway has been used for hauling wire, insulators, treated cross arms from Dawson Creek and telephone poles from places where suitable timber was obtainable. The telephone line parallels the highway throughout its length. At the time of the subcommittee's inspection, portable outfits for thawing frozen ground to make holes for poles were at work along the highway in Alaska.

The highway is serving as a guide to planes from the United States to Alaska and points beyond. Greatly increased movement of planes over this route has required the use of pilots unfamiliar with the region and to them the highway is a definite assurance that an airport and, if need arises, emergency landing fields, lie ahead. Radio-direction beams are used to guide the large movement of planes, but all electrical appliances fail at times and the highway is always there to serve as a guide. It may even be used for a plane landing in extreme emergency and this has already happened on one section of the road in Alaska.

During the summer of 1943 the heaviest traffic on the highway was between Dawson Creek and Whitehorse with a considerable movement north from Whitehorse toward, but not crossing, the international boundary. Supplies for the road, pipe line, telephone line, and airports have also moved from the ports at Valdez and Whittier over the Richardson Highway to Gulkana, thence over the new connection with the Alaska Highway to Tok Junction and thence both north and south over the highway.

The experience in building the highway across swampy and frozen ground in Yukon Territory from the Donjec River to the Alaska border, at places in Alaska, and in maintaining temporary crossings over a number of large glacier-fed streams indicates the wisdom of building a surfaced road to Alaska in advance of any critical need for large highway movements. During the winter and spring of 1942–43 icing and ice flows at temporary river crossings made truck travel hazardous and at times impossible. In the spring a long section of road in Yukon Territory became impassable and remained so until the final road was built. Barriers placed by nature could be overcome only by substantial construction. The road now being completed removes these barriers.

RELATION OF HIGHWAY TO OTHER TRANSPORTATION ROUTES

While the Alaska Highway begins at Dawson Creek, its actual southern terminal may be considered as Edmonton. This is on a main line of the Canadian rail network and is connected with Dawson Creek, 500 miles away, by a standard-gage branch line that has been materially improved during the past year. There is also a connection between the two points by a provincial highway. This highway,

with the exception of 150 miles nearest Edmonton, has been in very poor condition but is being rapidly improved by Canadian authorities with modern road equipment.

From Dawson Creek to Whitehorse, the highway is through a complete wilderness that has been without means of transport to the outside world except in the immediate vicinity of the airports. The mineral and other resources of this region are not yet thoroughly explored. The Canadian Government is now exploring the region and the highway will make possible the development of whatever resources may be found.

At Whitehorse the highway is connected by narrow-gage railroad with Skagway, one of the main Alaska ports of call. This rail line has been taken over by the Army, greatly improved, and is now carrying a large freight movement. A new highway is now being completed from the port of Haines near Skagway to connect with the Alaska Highway at a point 92 miles beyond Whitehorse. Flow of freight from Skagway is now mainly toward the interior, but circumstances might arise when it would be desirable to supply Skagway and other ports along the Gulf of Alaska by the land route extending back to Edmonton and to points along our northern border.

Whitehorse is a historic port for river steamers of considerable size that go down Lewes River, through Lake La Barge and down the Yukon River to its mouth 2,000 miles away. The first portion of this route is the one followed in the rush to the Klondike gold fields in 1898. This route is not of great war significance but is of importance in the future development of the region.

At Tok Junction, almost 100 miles beyond the Alaska-Yukon border, a branch of the highway goes off to Gulkana on the Richardson Highway and thence to Pacific ports at Valdez and Whittier. This connection has been used mainly for movement of supplies and equipment from Valdez to the highway and the airports along it, but it will be ready whenever there may be need for movement in the opposite direction. The population of Alaska is concentrated mainly in the coastal region along the Gulf of Alaska. These people and the military forces in the Northwest Pacific area have been dependent almost wholly on water transport along the Pacific coast for necessary supplies from the United States. As there are no roads along the coastal area they have been dependent upon the water route for intercommunication. While this route will be continued in use in normal times, it is desirable that there be an alternate land route.

At Big Delta the highway connects with the Richardson Highway and is coincident with it on to Fairbanks. At Fairbanks the highway connects with the railroad from the ports at Anchorage and Seward.

From Fairbanks an existing road extends northeast to Circle on the Yukon River.

Beyond Fairbanks lies the air route to Siberia and Russia. This route is developed and in use, but details concerning it may not be disclosed.

TRAFFIC ON THE HIGHWAY

Records indicate that the average number of vehicles both military and civilian (contractors and commercial truckers under contract) clearing the stations along the Alaska Highway during September and up to 24th of October are as follows:

Station and average daily traffic

Dawson Creek	442	Swift River	163
Blueberry	306	Brooks Brook	215
Trutch	209	McCrae	665
Fort Nelson	173	Canyon	168
Summit Lake	172	Destruction	122
Muncho Lake	141	Cathedral	48
Coal River	108	Big Delta	122
Watson Lake	138	Fairbanks	254

POTENTIAL FEEDER ROADS

The highway that has been built, with its connections to Haines and with the Richardson Highway, if well maintained, are entirely adequate for the purposes for which they were built. The air-route facilities are being expanded and the need for supplies met on a scale larger than will ever be required after the expansion period is over. All needs are being met by movements over rail lines that lead directly from the central portion of the United States to Dawson Creek, and thence over the highway. The line of movement departs but little from a straight line between the Chicago area and the place of use. The capacity of the highway has not been taxed, even while many miles were still under construction. In view of this no need appears for supplementary routes as a war measure.

However, there are indications that additional feeder routes and connections may be desirable in the post-war development of northwest Canada. The people of British Columbia and many in the States of Washington and Oregon are interested in building a highway from Prince George, British Columbia, to a connection with the Alaska Highway, at some point between Dawson Creek and Whitehorse. Three different routes have been proposed, any of which would give a satisfactory connection over existing roads with Vancouver, Seattle, and other west coast cities. Canada is anticipating a considerable tourist traffic over the Alaska Highway after the war, and is desirous of providing alternate routes of travel. Reconnaissance is bering made for a Prince George connection with the highway, but cost estimates have not been announced.

With such a connection tourists could plan trips with a choice of the water route to Haines, Skagway, or Valdez the westerly land route via Prince George, or the route via Edmonton and Dawson Creek.

A Prince George connection is believed to be desirable as a tourist facility, for the development of the resources of northwest British Columbia, and for providing better communication between our Northwestern States and the Pacific Northwest area. But there is, no war need for the connection. It closely parallels the water route to Alaskan ports and could not compete in cost with water transport. The Alaska Highway, with its terminal facilities and organized transport to serve the airports, is fully adequate for the purpose and additional facilities are not needed.

Another feeder road of interest is the Blue River truck road which, it was announced late in August from Ottawa will be undertaken and possibly completed this year. This road will shorten the distance between Edmonton and Vancouver by approximately 300 miles. It will need much further development before it may be considered a tourist highway.

The Alberta authorities are already improving the Edmonton-Dawson Creek provincial road and are actively discussing construction of a cut-off that will shorten the distance by 88 miles.

Canadian officials have proposed the establishment of a national park in a large area in Yukon Territory lying west of the Alaska Highway and Kluane Lake. The area would be bounded by the highway, the Alsek River and the international boundary, and would include Mount Logan and other mountains forming a group that towers almost as high as Mount McKinley, with numerous glaciers on their slopes. A road or roads to penetrate this area would be a natural park development.

The mineral resources of Alaska have never been thoroughly explored. Great mountain ranges, glacial streams, and subarctic climate have been barriers to transport development that have taken the incentive from exploration. Exploration has been and is now under way under the auspices of the United States Geological Survey. The Alaska Highway offers the means of development of whatever may be found in a broad band across the northwest portion of the continent.

The Alaska Highway may well justify its cost by reason of the stimulus it will give to development of Alaska and its great resources. The extent of such development cannot, of course, be predicted, although it appears that it should be substantial. Likewise, the exact part the highway will play in such development cannot be foretold, but it is obvious that it will be a most important factor.

As stated above, connecting roads now completed or under construction, lead to the Alaskan coast at Haines, near Juneau and Skagway. Further, the coast at Valdez and Anchorage, and the country lying between those coastal points and the interior south and west of Fairbanks, can likewise be reached by a connecting road. Thus the highway will offer access to large sections of the coast of Alaska, in addition to the water route.

FINDINGS AND RECOMMENDATIONS

The subcommittee finds that:

1. At the time the project was conceived, it had been determined that Alaska would be defended mainly by air power. This required transportation of planes and supplies for servicing planes, not only to Alaskan airfields and bases, but also to intermediate airfields. Some of the larger transports and bombers can be flown from this country to Alaska without refueling or servicing en route. Smaller bombers and fighter planes, however, do not have fuel capacity, required to make a flight of this length, and must be refueled and serviced at intermediate airports during the course of the trip. In any event, in a flight of approximately 2,000 miles, it is inevitable that in many instances planes, regardless of their size and fuel capacity, will require repairs or service; they must land to obtain these repairs and be serviced. A chain of airports, running from Edmonton to Fairbanks, was in existence at the time the highway project was determined upon.

The United States has made a large investment in the facilities of these airfields along the route of the highway. Improvements made are of permanent value for defense of Alaska and should remain available to us after the war.

2. The highway, proposed by S. 579 ("To authorize the construction of a military supply highway to Alaska"), is not warranted at this time, for military purposes. The use of the necessary manpower, materials, and equipment cannot be justified during the war. The Alaska Highway, as now constructed, fills all military highway needs in connection with the defense of Alaska and offensives based on Alaska. If large numbers of troops are to be stationed in Alaska, then neither the Alaska Highway nor the highway provided for in S. 579 would be economical for supply purposes. The Alaska Highway is, however, sufficient as an emergency supply route to supplement the water route.

3. The gravel surface on the highway will require continuous maintenance; experience during the coming winter may indicate the need for additional measures to prevent icing on the road, and some of the timber bridges that have been continued in use may require replacement. Provision should be made for meeting these needs promptly as they arise.

4. The War Department should request the State Department to initiate negotiations at once with the Canadian Government looking to free use of the airfields after the war.

5. The Alaska Highway is of permanent value for the defense of Alaska and for its further development.

6. The present untreated gravel and crushed rock surface does not provide a tourist road. The Alaska Highway, as it is being completed, is entirely adequate for all anticipated military needs. Manpower and materials should not be used for constructing roads for tourists or commercial purposes until the war is over.

J. G. SCRUGHAM.
C. D. BUCK.
WM. LANGER.

APPENDIX A

HOUSE OF REPRESENTATIVES,
Washington, D. C., September 29, 1943.

Senator JAMES SCRUGHAM,
Senate Office Building, Washington, D. C.

DEAR SENATOR: Appreciate very much your calling me regarding your report on the Alaska Military Highway.

Briefly the situation regarding the International Highway Commission, of which I am chairman, is this: The Commission, in cooperation with a similar body from Canada, have since 1935, under Presidential directive, made complete studies of the feasibility and practicability of a highway to Alaska. Both questions were resolved in favor of such a highway at a reasonable cost long before the outbreak of the war. I know the reasons are obvious to you.

During 1938 and 1939 the two Commissions specifically dedicated themselves to the selection of the most practical route, based on sound engineering data, population, and geographical conditions. The joint Commissions agreed that the best route for a real highway into Alaska lay from the middle of British Columbia straight northwest into Whitehorse. There was a friendly dispute regarding what we then determined route A and route B, but both routes ran parallel and both lay in the so-called Rocky Mountain trough, that is, east of the coast range and west of the Rocky Mountain range. This route traversed not only the best country but also had some economical sense behind it.

Incidentally, the Army opposed the building of this highway for military reasons as late as December 10, 1941, three days after Pearl Harbor. Suddenly the military had a reversal of feeling and decided that they needed a land route to the important outpost of Alaska. Canadian forces then got busy and determined to select a route which would make connections between certain inadequate

but previously laid-out airports far in the interior. The Commissions believe these routes very impractical for both war and post-war use. Whether or not the route finally selected has been of sufficient military value to justify its existence I do not know, but I must concede there was some military merit in their decision but we still think they overlooked the fact that the highway to Alaska had a dual purpose.

Your committee have gone over this route and ofcourse have their own opinions thereon. I am quite familiar with it and my present opinion is that it will not have a complete post-war utilization without a Pacific-coast connection. The present Alaska Military Highway from Edmonton to Whitehorse completely bypasses Pacific-coast connections or any decent connection with my State, Oregon, California, and your own State of Nevada. No highway to Alaska can justify its economic existence without such a connection. Therefore, in view of the fact that the present highway does exist and has its own purposes we are now concentrating on the task of getting a highway connection from the so-called Prince George area, connecting up with the Alaska Military Highway in the vicinity of Whitehorse. It must be remembered that the present highway from Whitehorse on into Alaska follows the route selected by everyone.

British Columbia is up in arms about the matter because although a great portion of the southern part of the route runs through British Columbia territory, it not only bypasses but has no connection with any population or natural-resource area of the Province. They have felt so keenly about it that recently the Premier of British Columbia, Mr. Hart, allocated $6,000,000 to be added to any proposal this Government and the Dominion Government would make toward completing the real Alaska Highway. Engineering estimates place the cost of the connection at approximately $18,000,000. British Columbia wants to pay its one-third share.

It should be pointed out to the group further that the so-called Pan American Highway to the Panama Canal will be completed sometime next spring. Under present road conditions the long-time dream of the Pacific coast of highway connections north and south is completely shattered. All traffic from Mexico up to the Pan American Highway, through the United States into Alaska must be carried through the Middle West. This, as you kno v, is not the logical economic sequence of developments.

My purpose is, therefore, to continue my efforts and such is the purpose of the Commission, to attempt to obtain the one-third share from our Government, and western Canadians are going to do likewise from the Ottawa government. The connection, of course, has some present military value, but I am looking beyond that. I hope your group will see fit to agree without conclusions in this matter, because I know that if you do, not only you personally, but the Senate Roads Committee can give us powerful aid.

I think this important phase of Alaskan transportation now sadly lacking should be made a part of your report. I am sure that you will personally agree with our premises in this matter. We of the Pacific Northwest and the Delegate from Alaska will be eternally grateful for your consideration on this.

Very truly yours,

WARREN G. MAGNUSON, M. C.

APPENDIX B

HOUSE OF REPRESENTATIVES,
Washington, D. C., October 14, 1943.

Hon. JAMES G. SCRUGHAM,
United States Senate, Washington, D. C.

DEAR SENATOR SCRUGHAM: May I urge upon you and the committee of which you are chairman favorable consideration of the proposal to build the highway to Alaska, by construction of such a highway between Prince George, British Columbia, and Whitehorse, Yukon Territory, as is sought to be authorized by the bills (S. 579 and H. R. 331) now pending in the Senate and House, respectively.

Description of the desired highway, the construction of which has been urgently and unanimously recommended by the Alaskan International Highway Commission, and justification for such construction, are outlined as follows:

1. The proposed highway, commonly called the A route, would extend northwesterly from Prince George to Whitehorse, a total distance of 787 statute miles. On this route there is already in existence a road from Prince George to Fort

St. James, a distance of 114 miles, and the proposed highway would connect with the existing Alaska Highway at a point called Jakes Corner which is 50 miles east of Whitehorse. Therefore, the new road to be constructed is the line between Fort St. James and Jakes Corner, a distance of 623 miles.

2. This entire route lies in a series of connected valleys just east of the high and precipitous range of mountains which extends for hundreds of miles along the Pacific coast, through a large part of British Columbia and along all the southern and southeastern coasts of Alaska. On the line of the proposed highway the precipitation of both rain and snow is light, and a road, when built, would be usable without great cost for maintenance or snow removal on every day of the year. strange as it may seem, the available records show that the snowfall in this region is even less than it is 100 miles farther east on the Prince George-Watson Lake route which has been suggested both for highway and for railroad.

3. Explorations heretofore made indicate that the highway would generally be located on solid ground and that little muskeg or other swampy ground would be encountered on the entire route. While it is difficult to forecast the cost of such a road, as many elements of that cost will depend upon circumstances existing at the time of construction, it is notable that in the Territory of Alaska a road approximately 140 miles long was constructed in 1941 and 1942 through at least equally difficult country between the Richardson Highway and Palmer, Alaska, at a cost less than $20,000 per mile. It is, therefore, reasonable to assume that the total cost of the construction of the proposed new road and the rehabilitation of the section between Prince George and Fort St. James would not exceed $20,000,000. In this connection it is to be noted that supplies and crews for building the proposed road could readily be introduced at several points on the route through existing coastal approaches furnished by the Skeena and Stikine Rivers, as well as from the two ends of the road at Whitehorse and Prince George.

4. The proposed new highway would permit branch highway connections with both Ketchikan and Wrangell, Alaska, thus making it usable and useful to practically all the inhabitants of the very important southeastern part of the Territory. The existing Alaska Highway does not furnish any opportunity for a connection with the important coastal cities of Alaska except for the fact that Whitehorse is connected with Skagway, Alaska, by the White Pass & Yukon Railroad, 111.4 miles long, and that a highway was recently built between the Alaska Highway at a point 108 miles west of Whitehorse, Yukon Territory, and the city of Haines, Alaska, situated on Lynn Canal.

5. Economically and commercially, Alaska is a part of the Pacific coast region. This is necessarily so by virtue of the fact that most of the commerce between Alaska and the States has been carried and will continue to be carried by sea. Therefore, the present Alaska Highway—not a continuous and completed highway from the States to Alaska as will be shown below—which feeds into the mid-continent area fails of being of the largest commercial and economic value to either the States or Alaska because there is no probability that the commerce of Alaska will ever be routed to or from the mid-continent area. The proposed highway on the A route would, on the other hand, adequately supplement the sea routes and thus promote the commercial development both of Alaska and of the Nation at large so far as Alaska is concerned.

6. Moreover, it must be fairly evident that from a military viewpoint the Pacific coast area is really one inseparable defense or offense area. One may easily contemplate circumstances by which it will be found necessary to move troops and supplies from one point to another in the Pacific coast region. A road on the A route would serve that very purpose, making easy transportation of troops and supplies, and even aircraft, to meet any need that may develop in the entire northwestern region because, as pointed out above, a road on the A route not only would supply the interior of Alaska, but also intervening points on the coast which can be reached by avenues provided by nature through the coast range.

7. Perhaps most important of all is the fact that the journey from the States to Alaska by highway, or part by rail and part by highway, will be shortened by 187 miles through the building of the proposed highway on the A route. This, in itself, is enough to justify such construction. We have to consider not only the saving in time but also the saving in actual out-of-pocket cost for transporting supplies and personnel over 187 miles of unnecessary highway. Conditions may arise which will necessitate the freighting of considerable amount of military or other supplies into the central part of Alaska. For any substantial military requirements alone a movement of 1,000 tons of freight a day, 365,000 tons a year, over the highway would be moderate. Up until the present moment

it has never been possible to move freight over the Alaska Highway for as little as 10 cents per ton-mile. In fact, during the past summer Government contractors paid a standard uniform price of 18 cents per ton-mile for transportation on the Richardson Highway, and during the past winter 20 cents per ton-mile was paid for transportation of supplies over parts of the Alaska Highway. My inquiries have shown that the actual cost of such transportation on the Alaska Highway has never been below 12 cents per ton-mile. Therefore, it is an understatement, if anything, to fix the assumed cost of transportation on any highway to Alaska at 10 cents per ton-mile. Now, to go back to the original figure of movement of freight at the rate of 1,000 tons a day, or 365,000 tons a year, into Alaska, the simplest calculation will show that at 10 cents per ton-mile a saving of more than $6,800,000 would be effected by transportation of that volume over a highway built on the A route as against such transportation over the present route, because the A route is 187 miles shorter than the C route. In other words, a road built on the A route now, assuming the volume of freight indicated, would pay its cost in a little more than 3 years through savings in cost of transportation even calculated as low as 10 cents per ton-mile on the shorter A route.

8. The argument holds good even as to shipments from the eastern seaboard or the Central States. By rail the distance from Chicago to Dawson Creek, the southeastern terminus of the Alaska Highway, is a few miles longer than the distance from Chicago to Prince George, the southeastern terminus of the A route highway. The saving in distance on the A route of 187 miles mentioned above is, therefore, not at all offset by any other factor. Moreover, the rail line from Chicago to Prince George is all of standard width and in excellent condition, whereas the rail line from Chicago to Dawson Creek, necessarily by way of Edmonton, while of standard width is in poor condition between Edmonton and Dawson Creek, a distance of 495 miles.

9. As to the Alaska Highway, it should be remembered that at the present time, even with the Alaska Highway completed, there is no continuous highway between the States and Alaska. This is because our work in building the Alaska Highway began at Dawson Creek, the railhead, and the Alaska Highway was constructed from that place to Big Delta, south of Fairbanks, a distance of 1,531 miles. Paved highway from the States extends northerly into Canada as far as the city of Edmonton, the capital of Alberta. But between Edmonton and Dawson Creek, there is no highway worthy of the name, although there is in existence an unpaved and unsurfaced country road which is usable in dry weather but completely impassable in wet weather. However, on the A route there is already in existence an excellent highway from Prince George southwesterly connecting with Vancouver, British Columbia, and with Seattle and other Pacific coast cities, and the paved highway system of the States. Therefore, the construction of a highway on the A route would really give us a continuous and complete highway extending from the States into Alaska, something that is not yet even promised in connection with the Alaska Highway at the present time.

10. The only commercial United States air line now serving Alaska is Pan American Airways which flies between Seattle and Alaska by way of Prince George, British Columbia. The Northwest Airlines operates for the Army between Dawson Creek and Fairbanks but does not handle ordinary commercial traffic. Between Prince George and Alaska, the line of flight follows the A route very closely. At the present time between Prince George and Whitehorse, an air distance of 668.2 miles, the flight is mostly over wilderness with no emergency or other airfield on the entire route. A highway on the A route would permit the construction and servicing of suitable air fields for this air transport service. This is important, for it would be of inestimable military advantage, in time of need, to have a system or line of airfields on the line of the A route, paralleling the coast and about 125 miles distant therefrom.

11. The Alaska Highway, now virtually completed, serves and will continue to serve a highly useful purpose. It was built largely to service a line of airfields extending through northwestern Canada into Alaska. The purpose of having the highway serve as a supply line for Alaska was subsidiary. The Alaska Highway will continue to serve both purposes, but there is definite need of constructing a highway on the A route for all the reasons above stated.

Sincerely yours,

ANTHONY J. DIMOND, *Delegate.*

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